Course Title: **Decision Support Systems** Course Code: CCE32H4 Year: 3rd Computers

Mid Term Exam Solution Guide (2015/2016)

Q(1)

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1) a) The factors affecting decision making:

New technologies and better information distribution have resulted in more alternatives for management.

Complex operations have increased the costs of errors, causing a chain reaction throughout the organization.

Rapidly changing global economies and markets are producing greater uncertainty and requiring faster response in order to maintain competitive advantages.

Increasing governmental regulation coupled with political destabilization have caused great uncertainty.

b) Because of the following reasons:

Technology / Information/Computers : increasing→ More alternatives to choose

Structural Complexity of organizations / Competition : increasing→ larger cost of error

International markets / Consumerism : increasing→ more uncertainty about future

Changes, Fluctuations : increasing→ need for quick decision

2) A system is a collection of objects such as people, resources, concepts, and procedures intended to perform an identifiable function or to serve a goal. There are two types of systems in organizations: closed systems and open systems. An open system interacts with its environment through giving and receiving information. Closed systems are closed off from the outside environment, and all interaction and knowledge is transmitted within the closed system only. In practical world there are no systems that are absolutely closed. Systems that have relatively limited interaction with its environment are, therefore, considered closed systems

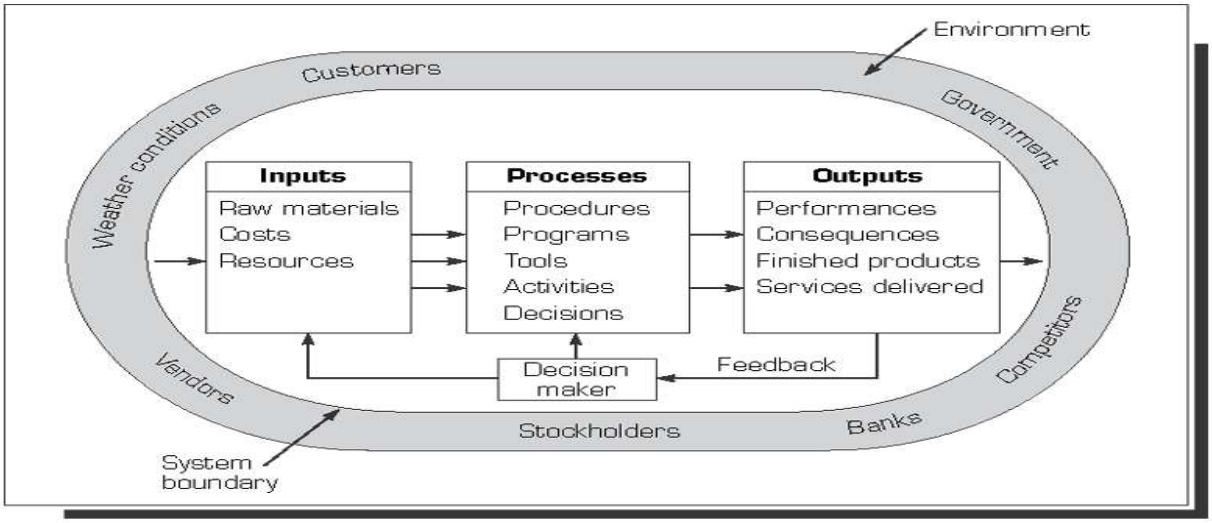
For example, the a *research-and-development* (R&D)department of a company may have much less interaction with people outside the department as compared to marketing department.

Therefore, we may consider the R&D department organization as a closed system, and *Marketing department* organization as an open system.

A *production line* is an example of a closed system within an organization. The daily work that takes place on production or assembly lines can be insulated from outside factors such as day-to-day meetings between upper-level executives, or information from other similar, competing production lines.

- Structure
  - Inputs
  - Processes
  - Outputs
  - Feedback from output to decision maker
- Separated from environment by boundary
- Surrounded by environment

Figure 2.1 The System and Its Environment



Environmental Elements Can Be

- Social
- Political
- Legal
- Physical
- Economical

3) Transaction Processing Systems (TPS): are the basic business systems that serve the operational level of the organization. And it is also a computerized system that performs and records the daily routine transactions necessary to conduct business.

Management Information Systems (MIS): serve the management level of the organization, providing managers with reports and often-online access to the organization's current performance and historical records and primarily serve the functions of planning, controlling, and decision-making.
Decision-Support System (DSS): also serve the management level or the organization. DSS help mangers make decisions that are unique, rapidly changing, and not easily specified in advance.
Executive Support System (ESS): serve the strategic level of the organization. They address nonroutine decisions requiring judgment, evaluation, and insight because there is no agreed on procedure for arriving at a solution.

Q2)

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1)

Assume:

- **Y** :the value of obtained production(output)
- **L** :the value or quantity of labour employed in production (input)
- **K** :the value or quantity of capital employed in production(input)
- Labour partial productivity index
- The labour partial productivity index (LPI) is given by:

$$P_L = \frac{Y}{L}$$

- The time comparison between the present year t and a base year s (generally the previous year) can be obtained by calculating the variation of the partial productivity labour index

$$\frac{Y_t}{L_t} / \frac{Y_s}{L_s} = \frac{Y_t}{Y_s} / \frac{L_t}{L_s} = \frac{IY_{(s,t)}}{IL_{(s,t)}}$$

Capital partial productivity index

The partial capital productivity index (CPI) is given by:

$$P_K = \frac{Y}{K}$$

The time comparison between the present year t and a base year s (generally the previous year) can be obtained by calculating the variation index of capital partial productivity

$$\frac{Y_t}{K_t} / \frac{Y_s}{K_s} = \frac{Y_t}{Y_s} / \frac{K_t}{K_s} = \frac{IY_{(s,t)}}{IK_{(s,t)}}$$

$$IY(s,t) = \frac{Y_t}{Y_s} = \frac{24.6}{21.5} = 1.442$$

- So between the year s and t production increased of 44.2%.
- Then proceed to the calculation of the variation in productivity work from s to t.

$$IL(s,t) = \frac{L_t}{L_s} = \frac{140800}{132900} = 1.0594$$

- The variation of labour productivity from s to t is given by:

$$\frac{IY_{(s,t)}}{IL_{(s,t)}} = \frac{1.442}{1.0594} = 1.36$$

- It has therefore been, within the two years, an increase in the labor productivity by 36%.
- In a similar way it can be calculated the change in the capital productivity (+ 34.7%).

2) Scenarios provide flexibility in planning.

- Help validate major assumptions used in modeling
- Help to check the sensitivity of the proposed solutions to changes in the scenarios.
- The high graphical capabilities of computers.
- The high computation capabilities of computers.

Most interesting scenarios:

- The worst possible scenario
- The best possible scenario
- The most likely scenario.

- 3) A model is a simplified representation or abstraction of reality.

Reality is generally too complex to copy exactly.Much of the complexity is actually irrelevant in problem solving.

Advantages and disadvantages:

Modeling reduces the cost and time to solve a problem(make a decision).

While modeling may be resulting in bad decisions due to incorrect assumptions while building the model.

Models types:

- **Verbal Models.**

Verbal models use words to represent some object or situation that exists, or could exist, in reality. Verbal models may range from a simple word presentation of scenery described in a book to a complex business decision problem (described in words and numbers).

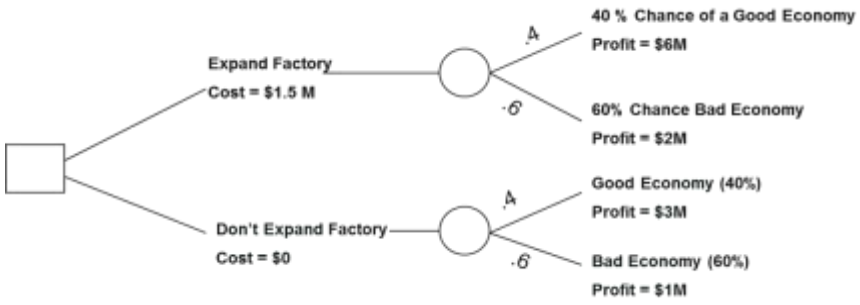
- ***Iconic (Scale or physical) Models*:** Physical replica (relative shape, form, and weight) of a system(three dimensional models) they represent

Cumbersome and time consuming

- ***Analog(schematic) Model*** behaves like the real system but does not look like it (symbolic representation)(two-dimensional charts or diagrams).They can be physical models, but the shape of the model differs from that of the actual system
- ***Mathematical (Quantitative) Models*** use mathematical relationships to represent complexity.(V=IR)

***Mathematical (Quantitative) Models u*sed in most DSS analyses.**

4)



$NPV_{Expand} = (.4(6) + .6(2)) – 1.5 = \$2.1M$

$NPV_{No\ Expand} = .4(3) + .6(1) = \$1.8M$

$2.1 > 1.8, therefore she should expand the factory